

REMARKS

Reconsideration of the Restriction Requirement is respectfully requested. The examiner has identified two groups of invention as follows:

1. Group I: Claims 1-12 and 33 drawn to a cover gas composition for the protection of molten magnesium/magnesium alloy;
2. Group II: Claims 34-51 drawn to a method of protecting molten magnesium/magnesium alloy.

Applicants provisionally elect the composition claims of Group I and traverse the Restriction Requirement.

It is noted that claims 1,13-32, 35-38, 42, and 47-48 have been cancelled. Therefore, the claims remaining in Group I are claims 2-12, and 33 and the claims remaining in Group II are 34, 39-41, 43-46 and 49-51.

It is applicants' understanding that the guidelines used in making a Restriction/Election Requirement are set forth in the MPEP's Administrative Instructions under the PCT entitled "*Annex B Unity of Invention*."

Applicants have studied these Administrative Instructions governing unity of invention and respectfully submit that unity of invention exists between the Group I composition claims 2-12 and 33 and the Group II method claims 34, 39-41, 43-46, and 49-51.

Applicants respectfully submit that the examiner's basis for making the Restriction Requirement is not in compliance with the MPEP's Administrative Instructions under the PCT entitled "*Annex B Unity of Invention.*"

Applicants' previous Amendment filed April 12, 2004, contained a detailed discussion on pages 9 and 10 regarding the criteria set forth in *Annex B Unity of Invention* which supports applicants' position that unity of invention exists between the composition claims of Group I and the method claims of Group II.

In this regard, the examiner's attention was invited to Example 1 in the MPEP on page AI-67 which contains 3 claims to illustrate unity of invention. Claim 1 recites a method of manufacturing chemical substance "X". Claim 2 recites substance "X". Claim 3 recites use of the substance "X" as an insecticide. Example 1 states that unity exists between Claims 1, 2 and 3 because the special technical feature common to all claims is substance "X".

In a similar fashion, in the subject patent application, Group I composition claims 2-12 and 33 recite a cover gas composition adapted to protect molten magnesium/magnesium alloy. Group II claims 34, 39-41, 43-46, and 49-51 recite a method of protecting molten magnesium/magnesium alloy using the cover gas composition of Group I.

The special technical feature common to the claims in Group I and Group II is the cover gas composition. Therefore, it is respectfully submitted that unity of invention exists. Accordingly, claims 34, 39-41, 43-46, and 49-51 should be included in the examination of this application.

In addition to the restriction requirement the examiner maintains that claim 1 is obvious in view of U.S. Patent No. 5,116, 868 to Dougherty, Jr. et al. relying on column 2, line 65 to column 3, line 33 which discloses a fire extinguishing composition that contains trifluoromethane. This ground of rejection is respectfully traversed. Applicant's claimed invention excludes trifluoromethane, which is an essential component of Dougherty's composition. Accordingly, Applicant's claimed invention is patentably distinct over Dougherty et al. Therefore, the special technical features linking the restricted groups do provide a contribution over the prior art and a single inventive concept exists.

The examiner also maintains that claims 7 and 10 do not differ from the difluoromethane disclosed by Dougherty et al. at column 3, line 7. Applicants respectfully disagree. The difluoromethane disclosed by Dougherty et al. is a component of a trifluoromethane-containing fire-extinguishing composition. Applicants' claimed invention does not contain trifluoromethane.

Accordingly, reconsideration and withdrawal of the Restriction Requirement and the examination of all claims currently pending in this application is respectfully requested.

All independent claims in this application and the claims dependent thereon now exclude trifluoromethane. In addition, independent claims 5, 10, 34 and 44 recite that the composition contains "up to less than 1% by volume" of a fluorine-containing inhibiting agent. Support for the recitation of up to less than 1% by volume, can be found in the specification at page 3, lines 20-22 which state:

"Preferably, the composition consists of less than 1% by volume inhibiting agent and the balance carrying gas."

Accordingly, applicants respectfully submit that all claims are in full conformity with the requirements 35 U.S.C. §112.

Turning now to another issue, it should also be noted that the examiner did not acknowledge the Information Disclosure Statement (IDS) filed October 15, 2003 which cited Hungarian Patent document HUP9900536A. The IDS also supplied its English equivalent, European Patent No. 094370082. Acknowledgment of the IDS is also requested.

With regard to the prior art relied upon by the examiner, the rejection of claims 2-8 and 10-12 and 33 under 35 USC 103 as unpatentable over PCT publication W096/22129 is respectfully traversed.

It is respectfully submitted that the amendments to the claims now clearly distinguish the claimed composition over PCT Publication W096/22129. As already noted in the previous Amendment, applicants' claimed invention is a cover gas composition adapted for the protection of molten magnesium/magnesium alloy.

In contrast, WO 96/22129 is restricted to a fire extinguishing process and composition for Class A (trash, wood, or paper); Class B (flammable liquids or greases); and/or Class C (electrical equipment) fires (page 2, lines 12-22 and page 16, lines 7-12). There is no disclosure or suggestion in WO 96/22129 of a non-trifluoromethane-containing cover gas composition including up to less than 1% by volume of a fluorine containing inhibiting agent adapted to protect molten magnesium/magnesium alloy.

Moreover, those skilled in the art recognize the distinction between:

- (a) cover gas compositions for protecting molten magnesium/magnesium alloys, and
- (b) fire extinguishing compositions.

Cover gas compositions used to protect flammable substances, such as molten magnesium/magnesium alloy differ from fire extinguishing compositions in three significant ways as follows:

1. Cover gas compositions contain a minimal amount of active inhibiting agent to prevent fires. Applicants' invention claims less than 1% by volume of the fluorine containing inhibiting agent. The use of such small amounts of active inhibiting agent is not simply an economic decision. In magnesium foundries, fluorine containing active agents form hydrogen fluoride (HF). The presence of hydrogen fluoride in a magnesium foundry is undesirable because large amounts of HF can cause severe corrosion to foundry equipment, including steel crucibles which contain molten magnesium.

It is known, for example, that cover gas compositions containing 2% by volume sulfur hexafluoride (SF_6) have resulted in severe corrosion problems. Also, serious injury can result from SF_6 reaction products with steel that can react explosively with molten magnesium. Applicants' cover gas composition contains less than 1% by volume of a fluorine containing inhibiting agent.

In contrast, fire extinguishing compositions contain significantly higher levels of active agent than applicants' cover gas composition. This is because when a fire must be extinguished, the important and immediate concern is to put out the fire quickly. Accordingly, the greater amount of active agent in a fire extinguishing composition renders such compositions unsuitable as a cover gas composition because of the severe corrosion effect.

The examiner's attention is respectfully invited to Table C on page 31 of WO 96/22129 wherein the concentration of active fire extinguishing agent varies from 3 to 11.9 volume percent. Thus, the smallest concentration of fire extinguishing agent disclosed in WO 96/22129 is more than 300 volume percent greater than the fluorine containing inhibiting agent in applicants' claimed cover gas composition. See also page 30, lines 10-13 wherein the extinguishing composition is required to extinguish the fire in 30 seconds or less.

2. Cover gas compositions are used in the form of constant, small, quiescent flows of gas to prevent magnesium vaporization and subsequent combustion by producing a very thin surface layer or film on the molten magnesium/magnesium alloy that is impervious to magnesium vapor. The surface layer is on the order of 1 micrometer of magnesium oxide and magnesium fluoride. In contrast, fire extinguishing compositions are used after combustion occurs and are delivered in huge rushes of gas to extinguish a fire quickly.

3. Cover gas compositions are used at low pressures, for example 10-25% above atmospheric pressure. In contrast, fire extinguishing compositions are used at significantly greater pressure and are thus unsuitable as a cover gas composition.

The examiner's position is even more untenable in view of the examiner's admission that WO96/22129 does not disclose a cover gas composition for molten magnesium. See last two lines of page 3 of July 2, 2003 Office Action. Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

In response to the examiner's rejection on the top of page 5 of the Office Action that claims 10, 11 and 12 read on no inhibiting agent. Claims 10, 11 and 12 have been amended to recite that the composition includes "*up to less than 1% by volume*". Reconsideration and withdrawal of this ground of rejection is respectfully requested.

The rejection of claims 2-12 and 33 under 35 USC 103 as unpatentable over U.S. Patent No. 5,115,868 to Dougherty Jr. et al is respectfully traversed. Dougherty's composition consists essentially of trifluoromethane (col. 2, lines 65-68). Independent claims 5 and 10 inherently exclude trifluoromethane. The volume % of fluorine-containing inhibiting agent is also specified. In response to the examiner's statement on the top of page 6 of the Office Action, that the claim recitation of less than 1% by volume reads on zero, these claims have been amended to recite "up to less than 1%". Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

As discussed in the Amendment filed on September 26, 2003 on pages 13 to 14, Dougherty discloses a trifluoromethane composition to prevent and/or extinguish fire. Applicants' claimed composition does not include trifluoromethane, and molten magnesium/magnesium alloy is not disclosed in Dougherty. The flammable materials disclosed in Dougherty are paper, cloth, wood, flammable liquids, and plastic items (column 3, lines 64-68). There is no disclosure or suggestion in Dougherty of a non-trifluoromethane containing cover gas composition adapted for the protection of molten magnesium/magnesium alloy.

Since trifluoromethane has an extremely low boiling point and a high vapor pressure, it acts as a propellant for fire extinguishers (column 4, lines 18-21). As the propellant, the trifluoromethane in Dougherty comprises from 0.5 weight percent to 99 weight percent of the composition. When trifluoromethane acts as its own propellant, it comprises 100% of the propellant extinguisher mixture (column 4, lines 31-38). In contrast, cover gas compositions are implemented in the form of constant, small quiescent flows of gas to prevent magnesium vaporization, and applicant's claimed composition does not contain trifluoromethane.

The examiner's reference to Examples 1 and 5 in Dougherty are not relevant because each example relates to fire extinguishing compositions wherein the active agent is present in about 8.7-23.8 volume %. This amount is

over 800 volume % greater than the largest concentration of non-trifluoromethane containing inhibiting agent in the cover gas compositions claimed by applicants.

Moreover, the examiner's position is even more untenable in view of his admission that Dougherty does not disclose a cover gas for molten magnesium. See July 2, 2003 Official Action, page 3, last 2 lines. Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

The rejection of claims 2-8, 10-12 and 33 under 35 USC 103 as unpatentable over PCT Publication WO91/02564 is respectfully traversed.

Claims 2-8, 10-12 and 33 recite non-trifluoromethane containing cover gas compositions containing less than 1 volume % of fluorine inhibiting agent. As discussed in the arguments presented in applicants previous Amendment filed September 26, 2003, WO 91/02564 is restricted to fire extinguishing. WO 91/02564 discloses the use of blends of hydrofluorocarbons and other fire extinguishing agents to rapidly extinguish fires (page 2, line 25 to page 3, line 1). The concentration of the fluorinated fire extinguishing agents varies from about 3-15 volume %, preferably 5-10 volume % (page 4, lines 22-25). The hydrofluorocarbons are present at a level of at least 10% by weight of the blend (page 5, lines 33-36 and page 6, lines 22-36).

All the examples in WO 91/02564 relate to fire extinguishing compositions. The volume of fire extinguishing agent ranges from 2.4 volume % to 14.1 volume %. This is more than 240% greater than the fluorine containing inhibiting agent in applicants' cover gas composition which has less than 1% volume of the total composition.

Moreover, the examiner's position is even more untenable in view of his admission that WO 91/02564 does not disclose a cover gas composition adapted for the protection of molten magnesium/magnesium alloy. See July 2, 2003 Office Action page 3, last two lines.

The rejection of claims 2-12 and 33 under 35 USC §103 as unpatentable over the previously relied upon WO 96/22129, Dougherty et al and WO 91/02564 further in view of U.S. Patent 6,167,944 to Ricketts et al is respectfully traversed.

Applicants have already discussed in detail the significant individual deficiencies of WO 96/22129, Dougherty et al and WO 91/02564. Moreover, as noted, the examiner has admitted that these references do not disclose a cover gas composition for molten magnesium/magnesium alloy. The combination of these references only compounds the deficiencies of each reference. These deficiencies are further compounded by the examiner's reliance on U.S. Patent 6,167,944 to Ricketts et al.

Ricketts et al discloses a method and system for ingot mold casting of metals and the use of an inert protective gas supplied to the space where the casting occurs. The inert gases include nitrogen, argon or a mixture of nitrogen and argon, a dilute sulfur hexafluoride/air mixture, dilute sulfur hexafluoride/carbon dioxide mixture or a combination of air, carbon dioxide and sulfur hexafluoride (column 4, lines 50-58).

The disadvantages of sulfur hexafluoride as a cover gas composition have already been discussed on page 17 of the Amendment. In essence, when used as a cover gas, sulfur hexafluoride can be corrosive and react explosively with molten magnesium.

Ricketts et al do not disclose or suggest a non-trifluoromethane containing cover gas composition having up to less than 1% by volume of a fluorine containing inhibiting agent adapted for the protection of molten magnesium/magnesium alloy.


Moreover there is no incentive in Ricketts or any of the other prior art relied upon by the examiner to collectively suggest the claimed invention. It is respectfully submitted that a rejection of this type is at best based on selective hindsight reconstruction using applicant's claimed invention as a guide. The conclusions made by the examiner are not suggested in an obvious manner by the combination of references.

Therefore, reconsideration and withdrawal of this ground of rejection is respectfully requested.

Respectfully submitted,

Dated: July 23, 2004
RODMAN & RODMAN
7 South Broadway
White Plains, New York 10601

Telephone: (914) 949-7210
Facsimile: (914) 993-0668
931-08


Charles B. Rodman, Reg. No. 26,798
Attorney for Applicants